

The following summary is taken from the April 5, 2016 City Council Memo on the Civic Area Update.

Flood Impact

Background

Boulder's Civic Area is located within the 100-year floodplain with much of the land located within the High Hazard Zone (HHZ) and the Conveyance Zone (CZ). At the start of the Civic Area planning process in 2011, the City Council affirmed the dual project goals of creating a vibrant civic park complemented by new and existing uses with increased activation, and enhancing public safety, with any improvements and new facilities meeting or exceeding the city's flood regulations. This became one of the guiding principles of the Civic Area Master Plan. Included in this guiding principle is the goal of avoiding placing new structures and parking in the HHZ and being proactive about planning for and educating about floods. City Council decided, as part of the Civic Area Master Plan and in accordance with the city's floodplain regulations, to remove the New Britain and Park Central buildings¹, all within the HHZ, to reduce potential hazards to life and property associated with flooding. These buildings house functions that are critical for flood recovery (e.g., utilities, transportation, and business support). A flood structural assessment conducted in 2012 concluded that the buildings, as constructed, are not able to withstand the 100-year flood event. In addition, the buildings are significantly older than their originally planned lifespan, contributing to increasing operation and maintenance costs. In response, council agreed that this is an appropriate time to plan for the future removal of these buildings from the HHZ.

It was also decided to remove most of the surface parking in the Civic Area, and replace it with pervious park features, while relocating some 600+ surface parking spaces into structured parking outside the HHZ. The Civic Area contains 13 scattered parking lots and almost 600 parking spaces. Approximately 300 surface parking spaces are located within the HHZ and the rest in the 100-year flood zone. Vehicles can become buoyant in as little as 18-inches of water and create a significant hazard. The majority of deaths as a result of flash floods are due to people attempting to drive their vehicles out of the flooded areas. Cars, when swept downstream by flood waters, also create a significant hazard. Reconfiguring or relocating some of the surface parking spaces, especially those located in the HHZ, could significantly reduce flood risks associated with cars.

Floodplain issues have been a concern in this area over many years and included in different studies. The September 2013 Flood event that impacted the Civic Area lands and city facilities as a result of flooding along Boulder Creek and Gregory Creek was considerably less than the 100-year storm event used for flood planning, but it still highlighted the need to carefully consider risk and uses in the floodplain. A flood analysis completed in 2013 for the Civic Area recommended that any new buildings be constructed outside of the 100-year floodplain and that

¹ Removal of the New Britain and Park Central buildings, with replacement at a location outside of the HHZ, is a critical safety need for the city and will improve conveyance in the area. Anthem Structural Engineering studied the soils, foundations and flood hydrology for these two buildings and determined that in a large flood event, "the foundations of both buildings would be undermined due to scour, which would result in the collapse of the structures."

planning efforts should proceed with an understanding of flood risk above and beyond the 100-year event.

In 2015 and early 2016, additional building assessments and the evaluation of potential flood mitigation work was undertaken in order to further examine the feasibility and risk of the on-going public use of existing buildings currently identified as being maintained and/or potentially modified in the Civic Area, including the Main Library, West Senior Center and the Atrium. While all of the sites in the Civic Area are impacted by floodplain and/or HHZ determinations, there are differences in the risks associated with potential flooding for each of the sites as discussed below.

Flood Constraints & Site Opportunities

Public safety must be considered for flood potential, but does not prohibit activation of areas in the floodplain or HHZ. A hierarchy of activation and uses related to safety should be considered. Uses that are outdoors and that do not confine the ability of people to evacuate from the area are safer than occupied buildings. For buildings, those occupied by the same people on a daily basis (such as office space) and who are aware of their situation and trained on how to respond is less of a risk than the circumstance of buildings used for assembly space (such as performance and theater) where occupants are not routinely in the building, may not have situational awareness nor training on how to respond during a flood event (or flash flooding). The following is a summary of the flood assessments in regards to constraints and opportunities for land uses and building structures at the west bookend:

Flood Constraints - West Bookend

Main Library

- Portions of the north and south wings of the library, along with the bridge that connects the north and south wings, are located within the HHZ. As a result, according to city regulations, the entire library building is subject to requirements for the HHZ which prohibit the expansion of either the footprint and/or increase in square footage of the building, and also limit the level of improvements that can be made to the building.
- It may be possible that mitigation measures for Boulder Creek could change the HHZ mapping and remove the north and/or south wings from the designation. Additional analysis would be required to make a determination on this issue.
- The recent detailed flood analysis determined that, while the areas north and south of the creek have generally similar conditions in regards to flood zone mapping, due to water flow depth and flow velocity, the area north of the creek poses a higher risk in comparison to the area south of the creek.
- The higher risk north of the creek suggests that assembly type uses in the current building should consider the acceptable level of risk with that use. For example, a regularly used performance/assembly space creates a higher risk to life safety and is a use that is less appropriate for this location. More informal uses such as a seating space for the café and small community groups have a lower risk potential. This leads to a recommendation that consideration be given to relocate these uses elsewhere in the long-term as part of facilities planning and the update to the Library Master Plan. Until such relocation, the Emergency Management Plan should be updated to reflect the current uses along with

enhanced communication with patrons. Flood mitigation improvements to the existing structure could be implemented to enhance safety and lower flood risks.

- The analyses also concluded that if the bridge that connects the north and south wing of the library were removed, then the area north of Boulder Creek could potentially be modified to allow construction of new buildings that were outside of the HHZ and elevated or flood proofed to the flood protection elevation. Similarly, options exist for redevelopment of facilities south of the creek, connecting to the existing Main Library building along Arapahoe. These site opportunities are described in the subsequent section of this memo.

West Senior Center

- The west edge of this building is impacted by Gregory Canyon Creek HHZ; however the rest of the site is not within the 100-year floodplain.
- While this site is not mapped in the 100-year floodplain, this facility was significantly impacted during the September 2013 floods and therefore flooding is a concern separate from the regulatory maps.
- Mitigation work for Gregory Canyon Creek could impact this site, and would also lower the flood risk to a portion of this site and Arapahoe Avenue. To accomplish this, it is likely that the current building would need to be removed.
- Examples of acceptable uses of this site with flood mitigation could be an above ground parking garage or office space. A redeveloped senior center use may also be acceptable, pending further design analysis to create acceptable egress and overall public safety during a flood event.

Municipal Building

- The 2012 updated Boulder Creek Floodplain mapping removed this building from the HHZ but the building remains in the 100-year floodplain and the conveyance zone.
- Additional floodproofing measures were recommended for this building in a 2013 structural and flood assessment.
- The building is a landmarked structure² and the Civic Area Master Plan envisions it could possibly be repurposed (if city facilities are consolidated in new building or multiple buildings) to create a vibrant mix of uses primarily focused on arts and culture.

Flood Constraints - East Bookend

Floodplain issues on the east end are different from those found on the west end of the civic area. While this area is covered by the 100-year floodplain of Boulder Creek, the HHZ and conveyance zone designations are more confined in this area as they follow Canyon, 13th and 14th where flood waters are then returning to Boulder Creek.

Atrium Building

- This building is not in the High Hazard Zone or the Conveyance Zone, but is within the 100-year floodplain.

². Landmark designation does not affect building use or interior changes; however, exterior alterations and additions must be approved through the Landmark Alteration Certificate process and consistent with adopted guidelines

- Previous floodproofing recommendations include building a flood wall and adding flood gates around the building, which could impact access and future uses.

13th/14th Block Overall

- The developable area in this block is impacted by 100-year floodplain for Boulder Creek, but most of the property is neither within the HHZ nor the conveyance zone.
- The street corridors are in the HHZ, which impacts access during a flood event; however it may be possible to add design elements to the site to provide access that is elevated over the HHZ.

Below grade parking structures are not recommended in the Boulder Creek area due to flood risk and ground water challenges. Below grade structures are at greater risk for flood damage to both the structure and the contents, and are also a risk for people that may try to leave the area during a flood. Mitigation for groundwater will also likely increase the cost for both construction and long-term operations of any below grade structure. Mitigation may also cause impacts to existing vegetation in the area.

Site Opportunities

Reuse or redevelopment to accommodate an increased program of uses in each “bookend” is technically feasible in a manner consistent with flood regulations. However, careful consideration will be needed to evaluate potential alternatives and their relative costs, appropriateness, impact on historic resources, and ability to mitigate life safety risks above and beyond minimum standards. The work completed in recent months has helped answer the question of whether new facilities *could* be developed; subsequent analyses and the engagement of stakeholders, boards, the public and council will need to determine whether they *should* be developed

Based on a preliminary architectural “test-fit” assessment of potential structures that could be designed to meet flood regulations and improve public safety, below is a summary of the site opportunities for future structures and programs at the west bookend:

Site Opportunities - West Bookend

North of Boulder Creek

- If the existing performance/assembly type uses such as the Canyon Theater and related programs at the north library building are not preferred because they create a high flood risk to life safety, the building could be repurposed for non-assembly lower risk uses that do not confine the ability of people to evacuate from the area. These uses would need to be carefully considered in relation to the Civic Area goals of increasing activation while improving flood safety. A related facility option is to plan for the long-term removal of the structure and replacement with a program of active and passive park uses. Obviously, any such change in use would require relocation of existing library uses elsewhere, which will need to be done as part of a broad planning process and community conversation. Until such relocation, flood mitigation measures to floodproof and reinforce the existing structure could be implemented as recommended by structural assessment of the building conducted in 2013 to lower flood risks.

- It is also possible to redevelop the north library site with a building that meets the city's minimum flood safety regulations and accommodates an assembly use, continued library use, or other program of activation. Such options can and should be considered based on the update to the Library Master Plan and other factors.

A preliminary architectural “test-fit” exploration of design options conducted as part the recent analysis of flood constraints and opportunities highlighted the potential for creating a new 2nd level bridge connection both across the creek (to a potential new parking structure just west of the existing Main Library on Arapahoe, south of the creek) and to the new Civic Use site across Canyon Blvd. by the St. Julien Hotel (see **Attachment H** for the preliminary architectural “test-fit” exploration). Under this design scenario, paths of egress allow for crossing over the HHZ area from Arapahoe to Walnut streets during flood events. Of course, this assumes that the north wing of the library³ is not landmarked and could be redeveloped with a new building, and that existing library functions are consolidated in an expanded campus south of the creek.

South of the Creek

- Structured parking that could accommodate 300-400 spaces, wrapped with a building for other uses (such as for the West Senior Center or relocated/expanded Library space) is possible west of the Main Library on Arapahoe. This would require relocation of existing housing on the site, which based on its current configuration is prone to flood risk. This potential approach would both support a continued or increased program of activity while improving flood safety through site reconfiguration and the relocation of existing surface parking spaces, consistent with the adopted Civic Area Master Plan.
- Future redevelopment opportunities also exist just east of the library along Arapahoe Ave. This opportunity would allow for a possible consolidated library campus south of the creek should the library consider this to be a desired option in the future.

Site Opportunities – East Bookend

- There are redevelopment opportunities for the 13th/14th St. block that would meet flood regulations and expand the program of uses, as identified in the Civic Area Master Plan. Specific uses to consider include a public market hall, parking structures to replace existing surface parking and address future needs, and uses such as city facilities, event space and supporting retail.

Proposed Next Steps

The work completed in recent months has helped answer the question of whether new facilities and increased activation *could* be accommodated, from a technical perspective, in a manner consistent with city flood regulations and the Civic Area's guiding principles.

Staff recommends that East Bookend planning be the priority focus for 2016 and into 2017, and that further work on the West Bookend proceed only after completion of the Human Services Master Plan, and in coordination with the update to the 2007 Library Master Plan. During this

³ Landmark designation does not affect building use or interior changes; however, exterior alterations and additions must be approved through the Landmark Alteration Certificate process and consistent with adopted guidelines

interim period the focus of work in the West Bookend will continue to be on enhancing the program in existing spaces (such as in the opening of the library's new MakerSpace and the arts cinema use in the library auditorium) and supporting the update to the Library Master Plan.

Significant work remains to engage key stakeholders and the community, evaluate program needs, test program and facility feasibility, determine costs and tradeoffs associated with alternative approaches, consider impacts and alternatives related to historic resources, and develop a preliminary preferred proposal for what *should* be developed in each bookend.